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REVIEW ARTICLE

A Systematic Review Evaluating Disparities in State-Run Quitline Utilization and Effectiveness in the U.S.

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Context: Cigarette smoking is a public health problem in the U.S. and is marked by pervasive sociodemographic disparities. State-run quitlines may offer greater access to cessation services that could in turn help to reduce smoking disparities. The aim of this review was to synthesize the body of literature regarding sociodemographic disparities in the utilization and effectiveness of state-run quitlines.

Evidence acquisition: The PRISMA guidelines were followed in conducting this review. Included articles were published between January 1, 1992 and May 28, 2019 and sourced from PubMed and Web of Science. Studies that evaluated state-run quitline utilization or effectiveness (cessation) by sex, race/ethnicity, sexual or gender identity, or SES (income, education, insurance) were included.

Evidence synthesis: Our search yielded 2,091 unique articles, 17 of which met the criteria for inclusion. This review found that quitline utilization was higher among Black and Asian/Pacific Islander individuals than among White individuals and among people with lower income and lower education than among people with higher income and higher education. Quitline use was associated with less smoking cessation among females than among males, among American Indian/Alaskan Native individuals than among individuals from all other races and ethnicities, and among individuals of lower than among those of higher income and education.

Conclusions: This review found that although communities disproportionately affected by smoking utilize quitlines more commonly than their White and more affluent peers, disparities in cessation persist for American Indian/Alaskan Native and individuals from lower SES groups who use quitlines.

CONTEXT

Nearly 14% of adults smoke cigarettes in the U.S.,[1] but certain population subgroups smoke at disproportionately higher rates. For example, males, American Indian and Alaskan Native individuals (AI/ANs), individuals of lower SES, and individuals who identify as sexual and gender minority (SGM) report higher cigarette usage than females, non-Hispanic White individuals, individuals of higher SES, and individuals who do not identify as SGM, respectively.[1] An abundance of tobacco-related disparities persist, especially for communities that have been historically marginalized in the U.S.[2,3] In this paper, we report the results of a

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systematic review conducted to understand how utilization and effectiveness of state-run quitlines in the U.S. differ for specific communities, defined by sex, race/ethnicity, SES, and SGM identity.

Quitting smoking can be difficult, as evidenced by the low 7.5% annual cessation rate in the U.S.[1] In addition to the difficulties of overcoming nicotine addiction, individuals from racial/ethnic minority and lower SES populations experience disproportionate personal and systemic barriers to quitting. Hispanic and non-Hispanic Black individuals, for instance, are less likely than non-Hispanic White individuals to use nicotine replacement therapy (NRT),[4,5] and Black individuals who smoke are half as likely to successfully quit as White individuals.[4] In many tribal communities, tobacco that is used ceremonially has been replaced with commercial tobacco, which is mass produced by tobacco companies and includes harmful chemical additives.[6–8] The cost of cessation aids and services potentially impedes individuals of low SES who smoke from successfully quitting,[9] although some evidence suggests that quitlines may help individuals of lower SES quit smoking owing to the free cost of access, the wide range of operation hours, and the general ubiquity of cellphones.[10–13]

All 50 states and Washington D.C. offer free quitline services to aid people who use tobacco in quitting, primarily through telephone-based individual counseling.[14] There is considerable heterogeneity with respect to operations and extent of services (e.g., number and length of sessions, hours of operation, and eligibility) by quitline.[15] For example, in 2018, general eligible callers were offered between one and an unlimited number of quitline counseling sessions, depending on their state.[16] Other cessation resources, such as low-to-no-cost NRT, cessation medications, self-help tools, referrals to other health providers, and web-based programs, often supplement counseling and vary according to state-/district-specific quitlines as well.[15] According to the North American Quitline Consortium's annual survey of quitlines, just under 1% of adults who smoke in the U.S. utilized quitline services in 2019, and 31.5% of people who used services had achieved at least 30-day abstinence at 7-month follow-up.[17]

The ubiquity of cell phones[18] and the minimal-to-no-cost services of quitlines reduce the logistic and economic barriers to cessation aids that disproportionately affect historically marginalized populations.[6,18,19] Many quitlines also offer counseling and resources in multiple languages as well as specialized materials and counseling protocols for marginalized populations, such as particular racial/ethnic minority groups (e.g., AI/ANs), individuals with low literacy, individuals with low SES, and SGM individuals.[15]

Although quitlines have been shown to improve cessation for people who access services,[20] there is less research regarding disparities in the utilization of quitlines and subsequent cessation across sociodemographic populations.[21] This paper serves to synthesize the existing literature on the utilization and effectiveness of state-run quitlines in the U.S., focusing on differences by sex, race/ethnicity, SES, and SGM identity.[15]

EVIDENCE ACQUISITION

Search Strategy

We conducted a systematic review of peer-reviewed published literature that analyzed quitline utilization and effectiveness in the U.S. across various sociodemographic characteristics. For this review, *utilization* was defined as a call to a state-run quitline by a person who smokes. Studies that only analyzed the efficacy of proactive enrollment[22] (i.e., having individuals complete fax referrals to quitlines at healthcare providers' offices), warm handoffs[23,24] (in which individuals are immediately introduced to quitlines), or cold calling[25] (quitlines contact individuals directly to inquire about interest in enrollment) were excluded from our review. One measure of utilization is reach or the number of people from a specific group utilizing quitlines, weighted by the percentage of adult persons who smoke in that sociodemographic group. *Effectiveness* was defined as self-reported or laboratory-confirmed cessation at any length of follow-up.

We searched for articles published between January 1, 1992 and May 28, 2019 using PubMed and Web of Science (Appendix 1, available online). The review included studies analyzing the use of state-run quitlines to aid in cigarette smoking cessation and excluded studies about any other tobacco products, such as E-cigarettes or chewing tobacco. We considered any study that quantitatively analyzed quitline utilization or effectiveness by sex (or binary gender), race/ethnicity, any of the 4 SES markers (income, education, health insurance, and composite SES—i.e., SES derived from 2 or more measures), or SGM identity. Insurance status is an SES proxy measure found to be associated with health outcomes in the U.S.[26] Studies were excluded from the review if they did not report on at least one of the demographic characteristics mentioned earlier or if they utilized data from countries other than the U.S. RCTs and experimental studies that assigned individuals to treatment groups were also excluded from this review.

Three authors (BJS, DCC, and JLC) independently screened the titles and abstracts for relevance. Full articles deemed relevant were assessed for inclusion

individually by the 3 reviewers. Disagreements were resolved by discussion among all authors.

We compared findings for each outcome of interest (utilization and effectiveness) within and across studies by sex, race/ethnicity, income, education, insurance status, composite SES, and SGM identity. Meta-analyses were not completed as part of this review. However, additional chi-square tests were conducted by authors for individual studies to determine differences in utilization or effectiveness between sociodemographic groups if data were available and if tests of statistical differences relevant to our review were not already conducted by the authors of the studies. Approval for this study from an IRB was not necessary owing to the analyses of already published studies and data.

EVIDENCE SYNTHESIS

Our initial search yielded 3,251 articles. After removing duplicates, 2,091 articles were reviewed. Of the 2,091 article titles screened for relevance, 1,040 were excluded. After screening abstracts of the remaining articles, 871 were excluded. Finally, 162 studies were excluded after the full-text review of the manuscripts. Ultimately, 17 articles published between 2000 and 2019 met our inclusion criteria; no studies published before 2000 met our inclusion criteria. Table 1 shows a summary of the studies included in our review. The PRISMA flow diagram in Figure 1 provides an in-depth description of our review process.

Utilization

A total of 13 of the 17 articles that met the inclusion criteria for this review assessed the differences in quitline utilization by at least 1 of the sociodemographic variables of interest (Table 2). Eight articles provided comparisons of quitline utilization across sociodemographic groups, and 5 presented information about groups but did not test for statistical differences.

Sex. Nine articles looked at differences in utilization by sex.[13,27–35] Four studies showed no evidence for variation in quitline utilization by sex,[27,28,30,36] whereas a fifth found evidence for greater than expected reach among females in Massachusetts (i.e., females made up a significantly larger percentage of Massachusetts quitline callers than the percentage of the population that smokes in Massachusetts that are female).[29] Four other studies found that females comprised a higher percentage of quitline callers than males, although no statistical comparisons were made.[13,32–34]

Race/ethnicity. Ten articles examined the differences between quitline utilization by racial/ethnic groups.[10,13,27,29–32,34,36,37] Two studies showed that Black individuals were more likely to call quitlines than White individuals.[10,27] Another study found that Asian individuals called the Chinese, Korean, and Vietnamese language arm of the California Quitline at higher rates than their White counterparts called the general California Quitline, but English-speaking Asian individuals were less likely to call than White individuals.[31] Another study analyzing the reach of quitlines in 45 states from 2011 to 2013 found that quitlines reached a significantly higher proportion of non-Hispanic AI/AN individuals and non-Hispanic Black individuals than would be expected by the population distribution as well as a significantly lower percentage of Hispanic individuals and Asian individuals than White individuals.[34] Furthermore, between 1994 and 1997, the Massachusetts Quitline reached a significantly higher proportion of Black and Hispanic individuals who smoked than that of White individuals who smoked, although there were no statistically significant differences between individuals categorized as other race/ethnicity and White individuals.[29]

SES. Two articles examined quitline utilization by income.[27,30] Statistical comparisons of utilization between individuals of varying income levels captured in the 2009–2010 National Adult Tobacco Survey (NATS) data found no significant difference between quitline utilization among individuals with higher and those with lower income.[27] A study about individuals who were aware of a quitline found that individuals with a household income of <$35,000 were significantly more likely to call a quitline than those with a household income of >$35,000.[30]

A total of 6 articles examined utilization by educational attainment,[27,29–31,34,38] but the only study that compared statistical differences in quitline utilization across education levels found no differences in utilization among NATS respondents from 2009 to 2010 with a high-school education/GED or greater and those who had less than a high school diploma.[27] One study found that individuals with less than a high school education made up a significantly lower percentage of Massachusetts quitline callers between 1994 and 1997 than the percentage of adults who smoked in Massachusetts who had less than a high school education.[29] Another study showed that most Pennsylvania and Minnesota quitline callers had a high-school degree or had received some college education.[38]

A total of 3 studies examined insurance status as a predictor of quitline utilization,[27,30,38] 2 of which found no differences in quitline utilization between insured

Table 1. Description of Articles Included in Study (N=17)

Study	Study details	Data set	Focus	
			Utilization	Effectiveness
Prout et al.[29]	A cross-sectional study analyzing utilization of Massachusetts Quitline between 1994 and 1997	MA behavioral risk surveillance system	X	
Maher et al.[40,41]	A longitudinal study analyzing utilization, 7-day cessation at 3-months follow-up, and satisfaction of Washington Quitline callers between 2004 and 2005, with results stratified by race/ethnicity and educational attainment	Independent data collection		X
Boles et al.[39]	Analysis of 7-day cessation, satisfaction, experiences, and perceptions of the Alaska Quitline among Alaskan Natives compared with those among non-Alaskan Natives who had set a quit date at 3 months follow-up, between 2006 and 2007	Independent data collection		X
Kaufman et al.[30]	Cross-sectional analysis of factors associated with awareness and utilization of quitlines in the U.S. in 2007	Health information national trends survey	X	
Zhu et al.[31]	Cross-sectional analysis of California Quitline utilization and how callers were made aware of the quitline for White individuals; English-speaking Asian individuals; and Chinese-, Korean-, and Vietnamese-speaking individuals between 1993 and 2008. Results included and analyzed calls to the Chinese, Korean, and Vietnamese language quitline and English-speaking quitline services.	California health interview surveys	X	
Zhu et al.[10]	Cross-sectional analysis of African American and White smokers calling the California Quitline between 1993 and 2009. Utilization rates were calculated by comparing crude calling numbers and smoking prevalence within subgroups.	Independent data collection, CTS	X	
Burns et al.[13]	Factors in nonadherence to quitline services: smoker characteristics explain little	NJH data	X	
Schauer et al.[27]	Prevalence and correlates of quitline awareness and utilization in the U.S.: an update from the 2009–2010 NATS	NATS	X	
Kerkvliet and Fahrenwald[42]	Tobacco quitline outcomes for priority populations	Independent data collection		X
Martinez et al.[37]	Oklahoma Tobacco Helpline utilization and cessation among American Indians	Independent data collection	X	X
Fallin et al.[28]	Smoking-cessation awareness and utilization among lesbian, gay, bisexual, and transgender adults: an analysis of the 2009–2010 NATS	NATS	X	
Lien et al.[38]	Tobacco user and characteristics and outcomes related to intensity of quitline program use: results from Minnesota and Pennsylvania	Independent data collection	X	
Lukowski et al.[32]	Characteristics of American Indian/Alaskan Native quitline callers across 14 states	NJH data	X	
Sedjo et al. 2016[34]	Smoking-cessation treatment: use trends among non-Hispanic White and English-speaking Hispanic/Latino smokers, Colorado 2001–2012	Attitudes and Behaviors Survey	X	
Lukowski et al.[33]	Characteristics of LGBT quitline callers across 14 states	NJH data	X	
Marshall et al.[34]	Race/ethnic variations in quitline use among U.S. adult tobacco users in 45 states, 2011–2013	National quitline data warehouse	X	
Allen et al.[35]	Gender differences in utilization of services and tobacco cessation outcomes at a state quitline	Arizona Smokers' helpline database		X
Total			13	5

MA, Massachusetts; CTS, California Tobacco Surveys; LGBT, lesbian, gay, bisexual, transgender; NATS, National Adult Tobacco Survey; NJH, National Jewish Health.

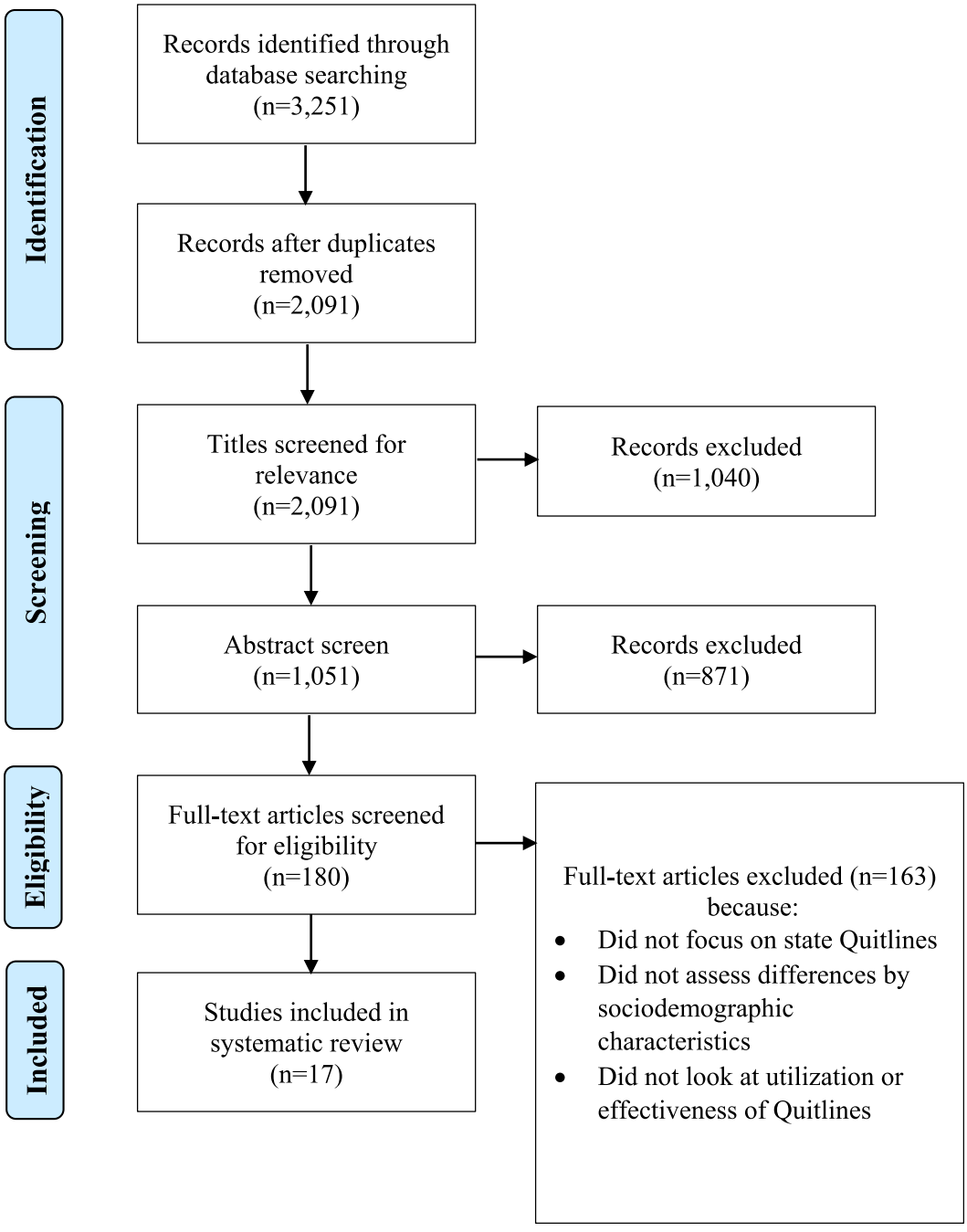

Figure 1. PRISMA flow diagram depicting stage articles were screened out of study.

and uninsured individuals using NATS data from 2006−2007 and 2009−2010, respectively.[27,30]

Sexual and gender minority identity. A total of 3 articles assessed utilization by comparing SGM individuals with non-SGM individuals.[13,28,33] In sex-stratified analyses, Fallin et al.[28] found no statistically significant differences in utilization between SGM and non-SGM persons who smoked in the 2009−2010 NATS data set, whereas the other 2 studies did not conduct statistical tests.[13,33]

Effectiveness

Five studies that met the inclusion criteria analyzed the effectiveness of quitlines in promoting cessation by 1 of our sociodemographic variables of interest (Table 3).

Table 2. Articles That Discussed Quitline Utilization for Specific Groups (N=13)

Demographic variable	Higher utilization	Lower utilization	No significant relationship	No statistical comparison between groups[a]
Race/ethnicity (compared with White, unless otherwise stated)				
Black	Prout et al., 2002;[b] Zhu et al., 2011[c,d]; Schauer et al., 2014[e]; Marshall et al., 2017	Zhu et al., 2011[c,d]	Kaufman et al., 2010[f]	Burns et al., 2012
Hispanic/Latino	Prout et al., 2002[b]	Marshall et al., 2017	Kaufman et al., 2010[f]; Schauer et al., 2014[e]; Sedjo et al., 2016[e]	Burns et al., 2012;
American Indian/Alaska Native	Marshall et al., 2017[b]			Martinez et al., 2015; Lukowski et al., 2016
Asian/Pacific Islander	Zhu et al., 2010[c]	Zhu et al., 2010[c]; Marshall et al., 2017	Zhu et al., 2010[c]	
Other/unknown/multiple races			Prout et al., 2002; Kaufman et al., 2010[f]; Schauer et al., 2014[e]	Burns et al., 2012
Sex (female compared with Male)	Prout et al. 2002[b]		Kaufman et al., 2010[g]; Schauer et al., 2014[e]; Fallin et al, 2016[b]; Sedjo et al. 2016	Burns et al., 2012; Lukowski et al., 2016; Lukowski et al., 2017; Marshall et al., 2017
Sexual or gender minority (compared with non-sexual or gender minority individual)			Fallin et al., 2016[g]	Burns et al., 2012; Lukowski et al., 2017
Income (low income compared with high income)	Kaufman et al., 2010[f]		Schauer et al., 2014[e]	
Education (low compared with higher education)	Kaufman et al., 2010[f]	Prout et al. 2002[b]	Schauer et al., 2014[e]	Lien et al., 2016[g]; Lukowski et al., 2017; Marshall et al., 2017;
Insurance status (uninsured/public insurance versus insured/ private insurance)			Kaufman et al., 2010[g]; Schauer et al., 2014[e]	Lien et al., 2016[g]

[a]Studies provided rates of utilization by sociodemographic group but did not conduct statistical tests or comparisons relevant to our inclusion criteria.
[b]Hand-calculated chi-square tests were conducted by our team to assess potential differences in quitline utilization by the sociodemographic variable of interest.
[c]Logistic regression.
[d]Study has estimates at multiple time points that yielded different results, which have been included in the table.
[e]Adjusted logistic regression.
[f]Chi-square test.
[g]Author-calculated chi-square test.

Table 3. Articles That Discussed Quitline Effectiveness for Specific Groups (N=5)

Demographic variables	Lower abstinence	No significant relationship
Race/ethnicity (compared with White, unless otherwise stated)		
Black		7-day point prevalence[38a]
Hispanic/Latino		7-day point prevalence[38a]
American Indian/Alaska Native	7-day point prevalence[37b]; point prevalence not specified[40]	7-day point prevalence[38b]; 30-day point prevalence[35]
Asian/Pacific Islander		7-day point prevalence[38b]
Other/unknown/multiple races		
Sex (female compared with male)	7-day point prevalence[33,37]; 30-day point prevalence[33]	7-day point prevalence[38a]
Low income (Compared with high income)		7-day point prevalence[37]
Lower education (compared with higher education)	7-day point prevalence[38b]	7-day point prevalence[37]
Low-composite SES (compared with high)		
Insurance status (uninsured/public insurance versus insured/private insurance)	Point prevalence not specified[40]	

[a]Author-calculated chi-square test.
[b]Reference group is non-AI/AN populations
AI/AN, American Indians and Alaskan Native individual.

The 5 studies included comparisons in quitline effectiveness by sex, race/ethnicity, and SES, but no studies analyzed quitline effectiveness in promoting cessation by SGM identity.

Sex. A total of 3 studies examined quitline effectiveness by sex; 2 of the 3 found lower cessation among females than among males,[35,39] whereas 1 study found no difference.[40] Specifically, Boles and colleagues[39] found that between 2006 and 2007, females had lower odds of being abstinent for at least 7 days than males, 3 months after calling the Alaska Quitline. Allen et al.[35] found that females calling the Arizona Quitline between January 2011 and June 2016 were less likely to report having successfully quit in the past 7 and 30 days at 7 months follow-up than males. However, one study analyzing 2004−2005 data from the Washington State Quitline found no statistically significant difference between the percentage of females having reported successful smoking cessation over at least the past 7 days after calling the quitline and that of males at 3 months follow-up.[40]

Race/ethnicity. A total of 4 studies examined quitline effectiveness by race/ethnicity.[37,39,41,42] Two studies showed that AI/AN individuals had lower cessation than other callers, whereas 2 studies found no differences in cessation between AI/AN, Black, Hispanic, or Asian/Pacific Islander individuals and White individuals. Specifically, Boles and colleagues[39] showed that among callers to the Alaska Quitline surveyed between 2006 and 2007, AI/AN callers had lower odds of reporting being abstinent for at least 7 days than non-AI/AN individuals, 3 months after calling the quitline. Kerkvliet and Fahrenwald[42] also found AI/ANs to have lower probabilities of quitting smoking after calling a quitline than individuals who were not in a designated priority population (i.e., were not AI/AN and also did not receive Medicaid, were not spit tobacco users, were not pregnant women, and were not aged <18 years). Two articles, Maher et al.[40,41] and Martinez and colleagues,[37] found no statistically significant differences in quit rates between AI/AN individuals and White individuals who used quitlines.[37,41] Maher et al.[40,41] also showed no statistically significant differences in quit rates between Black individuals, Hispanic and Latino/a/e individuals, or Asian/Pacific Islander individuals and White individuals.[41] No articles examined quitline effectiveness for individuals of multiple races or ethnicities.

SES. A total of 3 studies analyzed the effectiveness of quitlines by varying SES measures and found that quitlines may be more effective at promoting cessation for individuals of higher SES,[40,42] although some work has found no evidence for differential effectiveness of quitlines by SES.[39,43] Chi-square tests showed that between 2004 and 2005, individuals with some college education or a college degree were more likely to successfully quit smoking after calling the Washington State Quitline than those with a high school education or less.[40] However, Boles and colleagues[39] found no difference in quit rates by educational attainment or income among Alaska Quitline callers between 2005 and 2006. Finally, Kerkvliet and Fahrenwald[42] examined quitline use by

health insurance status, finding that Medicaid recipients calling the South Dakota Quitline between 2008 and 2013 were less likely to quit smoking than nonpriority populations.

DISCUSSION

We reviewed 17 peer-reviewed articles published between 2000 and 2019 to determine whether there were differences in quitline utilization or effectiveness by sex, race/ethnicity, income, education, insurance status, or SGM identity. Of the 17 articles included, 13 examined quitline utilization, and 5 evaluated quitline effectiveness. Findings from this review indicated that some populations disproportionately impacted by tobacco use (i.e., more likely to smoke or less likely to quit) are more likely to utilize state-run quitlines than individuals who are less impacted by tobacco use. However, our review also found that individuals in populations most adversely impacted by tobacco use are also less likely to successfully quit smoking after utilizing a quitline, eliciting concerns for health equity. Still, the small number of studies, heterogeneity in study design, and variability in results mean that findings should not be interpreted as causal, and more work is needed to evaluate quitlines in the context of health equity. Furthermore, many studies utilized self-reported cessation as a measure of effectiveness, which means that we could be overestimating the true prevalence of cessation if people who are less likely to quit are less quickly to participate in quitline surveys. This may be especially problematic if response rates are lower on the basis of sex, race/ethnicity, sexual orientation identity, gender identity, or SES.

Health Equity Impact of Quitline Findings on Utilization

Regarding utilization, it is encouraging from a health equity perspective that the little research that has examined racial/ethnic differences in quitline use has found that Black individuals call quitlines at higher rates than White individuals because studies show that Black individuals who smoke are less likely to successfully quit or utilize other evidence-based treatment options.[44–46] The large percentage of quitline calls by Black versus White individuals may be attributable to the higher degree of anonymity quitlines counseling offers,[10,21,47] a potentially preferable alternative to in-person counseling because of historical institutional racism and discrimination experienced by the Black community within healthcare settings.[48–50] Qualitative work has highlighted the potential promise of having community members that have used the quitline share their stories.[51] Findings from our review highlight the potential promise of quitlines to improve smoking-related disparities for Black populations if greater attention is given to increasing quitline awareness and fostering trust in quitlines among Black individuals who smoke. Similarly, quitline reach appeared higher for AI/AN individuals than for White individuals,[34] although AI/AN individuals were more likely than White individuals to only complete 1 call.[37] Differential attrition in quitline utilization by race and ethnicity is concerning,[13,37] and future research should try to understand what might be driving this disparity.

It is highly encouraging that linguistically adapted quitlines appear to drive utilization among non-White individuals. Specifically, one study found that Asian individuals who speak Chinese, Korean, or Vietnamese are more likely to call the California Quitline than White individuals who did not speak Chinese, Korean, or Vietnamese, which was likely because of the implementation of the California Quitline arm that was tailored specifically to Asian individuals who spoke Chinese, Korean, or Vietnamese.[31] This serves as an example of how quitlines can be adapted to be more accessible and improve reach among historically marginalized populations.

With respect to SES, one study in our review found that individuals of lower income and lower educational attainment levels were more likely to utilize a state-run quitline than their more socioeconomically privileged counterparts,[30] although other findings suggested that there were no differences by various proxy measures for SES.[27,30] The former finding that individuals of lower SES are more likely to call a quitline is supported by the idea that because quitlines are free and accessible through phones, they could reduce scheduling- and transportation-related barriers to quitting and serve as an equalizer in cessation-related treatment options for individuals of lower SES[10,21,52] However, quitline calls may present hidden costs and barriers, such as having access to a phone, expendable resources to own a private phone, or having a cellphone plan with unlimited minutes,[53] which may prevent low SES individuals from accessing them. These barriers could help explain why findings are not consistent across studies, and more research should be done to understand the reach of quitlines for individuals of lower SES.

Health Equity Impact of Quitline Findings on Effectiveness in Promoting Cessation

Overall, our review of the existing literature suggests that after calling a quitline, individuals who smoke and are disproportionately impacted by tobacco use (i.e., non-White individuals and individuals of lower SES) are less likely to successfully quit than individuals who face a lower burden of tobacco use or a less difficult time quitting (i.e., White individuals and individuals of higher SES). Regarding the difference in quitting by sex, 2 of 3

studies in our review found that females were generally less likely to successfully quit smoking than males after calling a quitline[35,39]; the third study showed no statistically significant difference in cessation by sex.[40] The literature base surrounding sex differences in cessation, in general, is mixed,[54] with research showing that females might be less likely to quit smoking than males, despite males generally smoking at higher rates.[55] However, a recent study found no evidence for differences in smoking cessation by sex.[56] Another study found no sex differences in cessation among the smoking population as a whole, but when including only those attempting to quit, females were less likely to succeed than males.[57] Differences could be the result of social norms and environments that create barriers to adequate health care that are particularly burdensome for women to overcome.[54]

In terms of cessation, it is concerning that AI/ANs were less likely to successfully quit smoking after calling 2 different state-run quitlines than non-AI/AN individuals.[39,42] AI/AN populations have the highest smoking rate of any racial/ethnic group in the U.S.[1] and face considerable barriers to quitting, including high rates of psychological distress because of historical trauma.[6] Furthermore, AI/AN individuals have lower utilization rates of pharmacotherapy and NRT than White individuals who smoke.[55,58] Moreover, AI/AN populations often have access to cigarettes with lower taxes on tobacco products owing to tax structures on reservations.[59] Given that taxes are a key tobacco control policy and have been shown to reduce the likelihood of tobacco use,[60] having access to cheaper products may perpetuate use among AI/AN individuals.

Finally, it is concerning that most studies in our review found that individuals of lower SES—a population with relatively high rates of smoking[1]—are less likely to successfully quit after calling quitlines than their higher SES counterparts.[40,42] Findings from our review suggest that quitlines alone are not effective in closing the gap in smoking-related disparities for lower SES populations and that other tobacco control tools must be used to improve cessation.

It is possible that quitlines assist in smoking cessation similarly for historically marginalized populations and their nonmarginalized counterparts, but given the additional barriers marginalized communities face to quitting, it might not always translate to sustained smoking cessation. It may be that quitlines are successful in aiding in cessation among populations that are disproportionately impacted by tobacco,[61] although more tailored efforts are needed to close the gap in cessation-related disparities.

Existing Gaps in the Literature

Our systematic review revealed that additional research is needed to evaluate whether quitline utilization and effectiveness differ by sex, race/ethnicity, SES, and SGM identity to clearly understand how they impact smoking-related disparities in the U.S. This is especially true for sexual minority (SM) individuals,[62,63] who smoke at higher rates than non-SM individuals and are less likely to be successful in quitting.[62] Furthermore, recent evidence suggests that structural stigma (such as policies that negatively impact SM individuals) has an adverse impact on smoking for SM populations.[64] Despite this, only 3 studies in our review examined quitline utilization rates in this population, and none examined effectiveness.[55] Additional evaluation is needed to show how culturally competent or language-specific quitlines, similar to the Chinese, Korean, and Vietnamese language quitline in California, meet the unique needs of specific populations. Finally, several studies have analyzed within-group differences in quitline utilization by race/ethnicity[32] and sexual and gender identity.[13,28,33] Understanding how the utilization and effectiveness of quitlines might differ on the basis of a multitude of intersecting social identities is important to shedding light on their potential health equity impacts and how quitlines might be adapted to better meet the needs of specific populations.

Limitations

A major limitation of this review is that studies varied widely in terms of the years (2000−2018), study populations (including several national and multistate surveys as well as state-specific data depositories), and which state quitlines were evaluated. Because quitline funding, operations, and services vary between states and over different time periods, it is difficult to understand the impact on health equity on a national scale. Furthermore, the 3 national studies included in our review only utilized data from 2010 or earlier and did not evaluate the differential effectiveness of quitlines in aiding cessation for vulnerable groups, so we have little with which we can compare disparate state-specific findings from more recent studies. In addition, our search was limited to literature that was available to us through 2 databases: PubMed and Web of Science; we did not search in the gray literature for additional articles, which may have restricted the breadth of literature included in our review. A fourth limitation of our study is that given our exposure to the utilization of a state-run quitline, we were unable to consider RCTs or experimental data, which inhibited our ability to make a causal inference. Another limitation is that not all studies conducted statistical tests to analytically compare outcomes between

different social groups. Where possible, we conducted chi-square tests to make the findings of studies that did not conduct relevant statistical comparisons easier to interpret within the context of this review. Although we did not use meta-analytic techniques to summarize the review findings owing to the heterogeneity between studies, this approach allowed for the comparison of similar outcomes rather than for categorizing these studies as having had no statistical comparisons made, which also does not capture the often sizable differences in the prevalence of quitline utilization or effectiveness by sociodemographic status. Future studies should conduct relevant statistical tests to further shed light on the potential health equity impact of quitlines. The findings of this review are not intended to be causal and should not be interpreted as such. Our review is also limited because we did not conduct a risk of bias assessment of the studies included, and therefore findings must be interpreted with caution regarding methodological biases. Finally, owing to resource constraints, our review only includes studies published between 1992 and May 2019. Still, this timeframe is relevant because it provides a depiction of quitline utilization and effectiveness by sociodemographic variables of interest from when quitlines were first launched, in 1992,[65] until just before the coronavirus disease 2019 (COVID-19) pandemic, after which patterns in quitline utilization and effectiveness may have changed.[66]

Despite these limitations, this review provides a robust synthesis of information about both the utilization and effectiveness of quitline services among marginalized communities and the potential they have to close gaps in smoking disparities. We also highlighted areas needed for additional research for racial/ethnic minority, lower SES, and SGM populations.

CONCLUSIONS

Quitlines are regarded as effective options to aid in smoking cessation among individuals who use them, but limited research has evaluated the utilization and effectiveness of state-run quitlines by sex, race/ethnicity, SES, or SGM identity, and more work needs to be done to understand the health equity impact of quitlines. Some public health advocates have pointed to quitlines as a treatment option that could be more accessible to individuals from racial-/ethnic-minoritized communities and individuals of lower SES who might face additional barriers to quitting smoking. Our review found that although communities disproportionately affected by smoking, including racial/ethnic minority communities and people from lower SES groups, utilize quitlines more commonly than their White and more affluent peers, disparities in cessation persist among people who use quitlines. Additional efforts are needed to improve cessation to promote health equity.

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DECLARATIONS OF INTEREST

None.

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SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.focus.2022.100042.

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